Georgian Scientists
ქართველი მეცნიერები
Vol. 8 Issue 4(1), 2026
https://doi.org/10.52340/gs.2026.08.04(1).112

ARTIFICIAL INTELLIGENCE IN MEDICINE: HOW EMERGING TECHNOLOGIES ARE TRANSFORMING HEALTHCARE

Thornike Zedelashvili

Information Security Department, Digital Governance Agency of the Ministry of Justice, Tbilisi, Georgia

The relevance of this study is driven by the global transformation of healthcare, where artificial intelligence has evolved from an auxiliary tool into a systemic driving force. According to 2024 data, the global AI market in healthcare was valued at USD 14.92 billion and reached an estimated USD 21.66 billion in 2025. Experts project that it will grow to USD 110.61 billion by 2030, at a compound annual growth rate of 38.6%. By 2024 alone, the U.S. Food and Drug Administration had approved 882 artificial intelligence-based medical devices for market use, while in several American hospitals more than 40% of chest X-ray interpretations are already performed with AI support. This indicates that the technology has moved beyond the experimental phase and into routine clinical practice.

The objective of our research is to systematically analyze how artificial intelligence is reshaping diagnostics, treatment personalization, drug discovery, and medical administration; to identify the benefits and risks it creates at the global level; and to examine the specific challenges Georgia faces in this process.

The study employs a mixed-methods approach that includes a quantitative analysis of international scientific databases and market reports, a qualitative review of Georgia's legislative framework, digital infrastructure, and academic initiatives, and an analysis of semi-structured interviews with field experts.

The core of the paper demonstrates that artificial intelligence has enabled a substantial increase in diagnostic accuracy in radiology, ophthalmology, and pathology, optimized time and cost expenditures, and advanced the development of personalized medicine. At the same time, it has raised critical issues related to data privacy, algorithmic bias, and ethical responsibility.

A distinct section is devoted to the Georgian context. Although Georgian legislation does not prohibit the use of artificial intelligence in public institutions, no specific regulatory framework currently exists. The Georgia Artificial Intelligence Association's priorities for 2024–2025 remain

talent identification, professional development, and awareness-raising, which indicates that the country is still at an early stage of adoption. Key challenges include low levels of digital technology integration in clinics, the fragmentation of electronic health records, a shortage of qualified personnel, and insufficient investment.
Particular attention is given to the financial dimension. International experience shows that the initial implementation of AI requires significant capital expenditure for infrastructure, licensing, and workforce training. However, in the medium term it reduces diagnostic and administrative costs by 30–40% and alleviates the financial burden of chronic disease management — a factor of critical importance for a resource-constrained country such as Georgia. Accordingly, the study proposes a hybrid financing model for Georgia based on public-private partnerships, international grant programs, and the involvement of the insurance sector, to ensure that high-technology services become accessible within the framework of universal healthcare.

Keywords: Artificial Intelligence, Digital Healthcare, Medical Diagnostics, Georgian Healthcare System, Healthcare Economics